

**Clean copy of the claims**

1 (Canceled)

2 (Previously presented) A dynamically reconfigurable VLSI device for implementing in hardware any multiple outputs combinational target circuit having the output functions expressed in logical sum-of-product equations with a maximum of  $m$  inputs, a maximum of  $r$  outputs and a maximum of  $n$  product terms  $p(k)$ , comprising:

a register with  $m$  bits for storing the input variables;

$n$  cells, a cell  $C(k)$  for determining the logical value of a product term  $p(k)$  of said equations for given inputs,

a block of  $r$  OR gates, each one with  $n$  inputs, associated with said cells  $C(k)$  for receiving the logical value of product terms  $p(k)$  and outputting the  $r$  bits of output functions;

wherein said cell  $C(k)$  comprises:

a storage area for storing the information that characterizes a product term, named mask word, product word and function word;

first logic level means for receiving said  $m$  inputs and said mask word to produce a first intermediate result, which identify the input variables that form a product term;

second logic level means for comparing the said product term with said first intermediate result to produce a second intermediate result concerning a product term;

third logic level means for receiving said second intermediate result to produce the logical value of the product term; and

forth logic level means for transferring said function word to  $r$  outputs, according to said logical value of said product term  $p(k)$ , and subsequently to be OR-ed with function words of other product terms.

3 (Previously presented) A dynamically reconfigurable VLSI device as in claim 2, wherein said storage area of a cell C(k) comprises two m-bit registers and one r-bit register.

4 (Previously presented) A dynamically reconfigurable VLSI device as in claim 2, wherein said first logic level of a cell C(k) comprises  $m \times (2\text{-bit})$  AND gates, each one for receiving a respective bit of said m input variables and of said mask word to produce said first intermediate result.

5 (Previously presented) A dynamically reconfigurable VLSI device as in claim 2, wherein said second logic level of a cell C(k) comprises  $m \times (2\text{-bit})$  XNOR gates, each one for receiving a respective bit of said first intermediate result and of said product word to produce a bit of said second intermediate result.

6 (Previously presented) A dynamically reconfigurable VLSI device as in claim 2, wherein said third logic level of a cell C(k) comprises one m-bit AND gate to produce a logical value which is the value of the product term.

7 (Previously presented) A dynamically reconfigurable VLSI device as in claim 2, wherein said forth logic level of a cell C(k) comprises  $m \times (2\text{-bit})$  AND gates for transferring said function word to outputs, considering the logical value of said product term p(k).

8. (Currently amended) A dynamically reconfigurable VLSI device for implementing in hardware a target synchronous sequential circuit with maximum  $2^s$  states, clock input only and outputs taken from the state register, wherein the multiple outputs combinational circuit which establish the next state defined by sum-of-product logical equations is implemented according to claim 2, with maximum s inputs, maximum s outputs and maximum n product terms p(k) and wherein the input register is a state register with s bits; and further comprising:

a feedback connection to establish the next state.

9. (Currently amended) A dynamically reconfigurable VLSI device for implementing in hardware a target synchronous sequential circuit with maximum  $2^s$  states,  $m$  data inputs, clock input and  $r$  outputs, wherein two multiple outputs combinational circuits are implemented according to claim 2, the first combinational circuit defined by the next state sum-of-product logical equations with maximum  $(m + s)$  inputs, maximum  $s$  outputs and maximum  $n1$  product terms  $p(k)$  and the second combinational circuit defined by the output sum-of-product logical equations, with maximum  $s$  inputs, maximum  $r$  outputs, and maximum  $n2$  product terms  $p(k)$ ; and further comprising:

a state register with  $s$  bits, wherein said state register is the input register of the second combinational circuit;

a feedback connection to establish the next state.

10 (Canceled)

11 (Canceled)

12 (Previously presented) A dynamically reconfigurable VLSI device for implementing in hardware any multiple-output combinational target circuit defined by a group of logical sum-of-product equations, with maximum  $m$  inputs, maximum  $r$  outputs and a maximum of  $q$  product terms in each equation, having a register with  $m$  bits for storing the input variables and for each single sum-of-products logical equation, considered as an independent equation, further comprising:

$q$  modified cells, a modified cell  $C(k)$  for determining the logical value of a product term  $p(k)$  of said independent equation, for given inputs;

a single OR gate associated with said  $q$  modified cell  $C(k)$  for receiving the logical value of product terms  $p(k)$  to provide a single output for said independent equation;

wherein said modified cell C(k) comprises:

a storage area formed by two m-bit registers for storing the information that characterizes a product term, named mask word and product word;

first logic level that comprises  $m \cdot (2\text{-bit})$  AND gates, each one for receiving a respective bit of said inputs and of said mask word to produce a respective bit of first intermediate result, which identify the input variables that form a product term;

second logic level that comprises  $m \cdot (2\text{-bit})$  XNOR gates, each one for receiving a respective bit of said product word and said first intermediate result to produce a second intermediate result concerning a product term; and

third logic level that comprises one m-bit AND gate for receiving the m bits of said second intermediate result to produce a logical value which is the value of the product term.

13. (Currently amended) A dynamically reconfigurable VLSI device for implementing in hardware a target synchronous sequential circuit with maximum  $2^s$  states, clock input only and outputs taken from the state register, wherein the multiple outputs combinational circuit which establish the next state defined by sum-of-product logical equations is implemented according to claim 12, with maximum s inputs, maximum s outputs and maximum q product terms  $p(k)$  in each said equation and wherein the input register is a state register with s bits; and further comprising:

a feedback connection to establish the next state.

14. (Currently amended) A dynamically reconfigurable VLSI device for implementing in hardware a target synchronous sequential circuit with maximum  $2^s$  states, m data inputs, clock input and r outputs, wherein two multiple outputs combinational circuits are implemented according to claim 12, the first combinational circuit defined by the next state sum-of-product logical equations with maximum  $(m + s)$  inputs, maximum s outputs and maximum q1 product terms  $p(k)$  in each said next state equation, and the second combinational circuit

defined by the output sum-of-product logical equations, with maximum  $s$  inputs, maximum  $r$  outputs and maximum  $q2$  product terms  $p(k)$  in each said output equation; and further comprising:

- a state register with  $s$  bits, wherein said state register is the input register of the second combinational circuit;

- a feedback connection to establish the next state.

15 (Currently amended) A method for implementing target circuits selected from multiple-output combinational circuits and from synchronous sequential circuits, having their behavior described by groups of logical sum-of-product equations, wherein each said group of logical sum-of-product equations is implemented in a dynamically reconfigurable VLSI device, as in claims 2 or 12, the method comprising the steps of:

- inputting a request to reconfigure said VLSI device to said target circuit,

- identifying the VLSI device to be configured, considering its internal structure, of type cell  $C(k)$  or of type modified cell  $C(k)$ ;

- generating memory words uniquely defining each product term  $p(k)$  of said sum-of-products logical equations; and

- implementing the target circuit by storing said memory words into a corresponding registers of type cell  $C(k)$  or of type modified cell  $C(k)$ .